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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/848,778	05/03/2001	Peter A. BeereI	06666-077001/USC3027	6633

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FISH & RICHARDSON, PC
P.O. BOX 1022
MINNEAPOLIS, MN 55440-1022

EXAMINER

TORRES, JOSEPH D

ART UNIT	PAPER NUMBER
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2133

DATE MAILED: 06/29/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/848,778

Applicant(s)

BEEREL ET AL.

Examiner

Joseph D. Torres

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 36-102 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 36-102 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 04/12/2006 have been fully considered but they are not persuasive.

The Applicant contends, "Viterbi teaches computation of state metrics using serial prefix and suffix computations."

While that may be true, Viterbi also teaches Equations 5 and 6 in col. 6 of Viterbi, which are well known Prior Art prefix and suffix operations as defined by the Applicant and consistent with the Leighton reference. Equations 5 and 6 in col. 6 of Viterbi simply are well known Prior Art prefix and suffix operations. The Examiner would like to point out that there is a multitude of Prior Arts teaching various algorithms for using the prefix and suffix computations of Equations 5 and 6 in col. 6 of Viterbi.

The Applicant contends, "The alleged broad principles of "parallel prefix computations" would simply not have been recognized as applicable to perform parallel prefix and/or suffix operations to compute state metrics".

The Examiner disagrees and asserts that the Leighton reference teaches prefix operations on page 37. Figure 1-21 on page 38 of Thomson Leighton teaches the use of parallel prefix computations as applicable for computing prefix operations on page 37 of Thomson Leighton. One of ordinary skill in the art at the time the invention was made

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only has to recognize the forward state metrics are prefix operations as taught on page 37 of the Leighton reference. Anyone of ordinary skill in the art at the time the invention was made with good basic undergraduate mathematical skills should be able to recognize that Equation 5 in col. 6 of Viterbi is a prefix operation because that simply is just what it is.

The Applicant contends, "The alleged broad principles of "parallel prefix computations" would simply not have been recognized as applicable to perform parallel prefix and/or suffix operations to compute state metrics. This is at least for the reason that there is a data dependency in Viterbi that inhibits a parallelization of components to perform relevant computations-something the Office Action's rationale overlooks".

The Examiner disagrees and asserts that Figure 1-21 on page 38 of Thomson Leighton teaches how to overcome "data dependencies" in order to compute the prefix operations on page 37 of Thomson Leighton and equivalently the prefix operations of Equation 5 in col. 6 of Viterbi.

The Applicant contends, "In addition, as the broad principles of parallel computation could not easily be applied to the serial computations of the Viterbi algorithm that were limited by a serial computation having a data dependency, there is no reason to believe that one of ordinary skill in the art would have expected success by the mere combination of the references".

Equations 5 and 6 in col. 6 of Viterbi are well known Prior Art prefix and suffix operations. Figure 1-21 on page 38 of Thomson Leighton teaches how to overcome "data dependencies" in order to compute the prefix operations of Equation 5 in col. 6 of Viterbi and equivalently the prefix operations on page 37 of Thomson Leighton. The Examiner asserts combining Thomson Leighton with the teaching in Viterbi on well known Prior Art prefix and suffix operations only requires recognizing that Equations 5 and 6 in col. 6 of Viterbi are prefix and suffix operations. Anyone of ordinary skill in the art at the time the invention was made with good basic undergraduate mathematical skills should be able to recognize that Equations 5 and 6 in col. 6 of Viterbi are prefix and suffix operations because that simply is just what they are. Anyone of ordinary skill in the art at the time the invention was made would have been motivated to combine recognizing that parallel algorithms would have been used for computationally intensive calculations to speed processing up (see top line of page 2 in Thomson Leighton), which incidentally has been the motivation for parallel processing since the early 80's.

The Examiner disagrees with the applicant and maintains all rejections of claims 1-19 and 36-102. All amendments and arguments by the applicant have been considered. It is the Examiner's conclusion that claims 1-19 and 36-102 are not patentably distinct or non-obvious over the prior art of record in view of the references, Viterbi; Andrew J. et al. (US 5933462 A, hereafter referred to as Viterbi) and Thomson Leighton (F. Thomson Leighton, Introduction to Parallel Algorithms and Architectures: Arrays-Trees-Hypercubes, Morgan Kaufmann Publishers, Inc., 1992, pages 1-3, 36-45, 238 and 239)

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in view of Benedetto et al. (S. Benedetto, D. Divsalar, G. Montorsi, and F. Pollara, Soft-Output Decoding Algorithms in Iterative Decoding of Turbo Codes, TDA progress Report 42-124, Feb. 15, 1996) as applied in the last office action, filed 10/12/2005. Therefore, the rejection is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1, 2, 6-12, 15-17, 19, 36-38, 42-47, 50-52, 61-63, 67-71, 74-76, 85-90, 93, 94, 97, 98, 101 and 102 are rejected under 35 U.S.C. 103(a) as being unpatentable over Viterbi; Andrew J. et al. (US 5933462 A, hereafter referred to as Viterbi) in view of Thomson Leighton (F. Thomson Leighton, Introduction to Parallel Algorithms and Architectures: Arrays-Trees-Hypercubes, Morgan Kaufmann Publishers, Inc., 1992, pages 1-3, 36-45, 238 and 239).

See the Non-Final Action filed 10/12/2005 for detailed action of prior rejections.

3. Claims 3-5, 13, 14, 18, 39-41, 48, 49, 53-60, 64-66, 72, 73, 77-84, 91, 92, 95, 96, 99 and 100 are rejected under 35 U.S.C. 103(a) as being unpatentable over Viterbi; Andrew J. et al. (US 5933462 A, hereafter referred to as Viterbi) and Thomson Leighton (F. Thomson Leighton, Introduction to Parallel Algorithms and Architectures: Arrays-Trees-Hypercubes, Morgan Kaufmann Publishers, Inc., 1992, pages 1-3, 36-45, 238 and 239) in view of Benedetto et al. (S. Benedetto, D. Divsalar, G. Montorsi, and F. Pollara, Soft-Output Decoding Algorithms in Iterative Decoding of Turbo Codes, TDA progress Report 42-124, Feb. 15, 1996).

See the Non-Final Action filed 10/12/2005 for detailed action of prior rejections.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph D. Torres whose telephone number is (571) 272-3829. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert Decady can be reached on (571) 272-3819. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


JOSEPH D. TORRES
PRIMARY EXAMINER

Joseph D. Torres, PhD
Primary Examiner
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